WHAT IS CLAIMED IS:

1. A bioptical holographic laser scanning system, wherein a plurality of pairs of quasi-orthogonal laser scanning planes are projected within predetermined regions of space contained within a 3-D scanning volume defined between the bottom and side scanning windows of the system.

2. A novel bioptical holographic laser scanning system, wherein the plurality of pairs of quasi-orthogonal laser scanning planes are produced using a holographic scanning disc having holographic scanning facets that have high and low elevation angle characteristics as well as left, right and zero skew angle characteristics.

3. A bioptical holographic laser scanning system, wherein the each pair of quasi-orthogonal laser scanning planes comprises a plurality of substantially-vertical laser scanning planes for reading bar code symbols having bar code elements (i.e. ladder-type bar code symbols) that are oriented substantially horizontal with respect to the bottom scanning window, and a plurality of substantially-horizontal laser scanning planes for reading bar code symbols having bar code elements (i.e. picket-fence type bar code symbols) that are oriented substantially vertical with respect to the bottom scanning window.

4. A bioptical holographic laser scanning system comprising a plurality of laser scanning stations, each of which produces a plurality of pairs of quasi-orthogonal laser scanning planes are projected within predetermined regions of space contained within a 3-D scanning volume defined between the bottom and side scanning windows of the system.

5. A bioptical holographic laser scanning system, wherein the plurality of pairs of quasi-orthogonal laser scanning planes are produced using a holographic scanning disc supporting holographic scanning facets having high and low elevation angle characteristics and left, right and zero skew angle characteristics.

6. A bioptical holographic laser scanning system, wherein each laser scanning station produces a plurality of pairs of quasi-orthogonal laser scanning planes which can a read bar code symbol that is orientated with bar code elements arranged in either a substantially vertical (i.e. picket-fence) or substantially horizontal (i.e. ladder) configuration with respect to the horizontal scanning window of the system.

7. A bioptical holographic laser scanning system employing four laser scanning systems, wherein the first and third laser scanning stations employ mirror groups and scanning facets having only high elevation characteristics and left and right skew angle characteristics so as to produce from each station a plurality of pairs of quasi-orthogonal laser scanning planes capable of reading bar code symbol orientated with bar code elements arranged in either a substantially vertical (i.e.

picket-fence) or substantially horizontal (i.e. ladder) configuration with respect to the horizontal scanning window of the system.

8. A bioptical holographic laser scanning system, wherein the second laser scanning station employs mirror groups and scanning facets having only low elevation characteristics and zero skew angle characteristics so as to produce from each station a plurality of pairs of quasi-orthogonal laser scanning planes capable of reading bar code symbol orientated with bar code elements arranged in either a substantially vertical (i.e. picket-fence) or substantially horizontal (i.e. ladder) configuration with respect to the horizontal scanning window of the system.

9. A bioptical holographic laser scanning system, wherein the fourth laser scanning station employs mirror groups and scanning facets having only high elevation characteristics and zero skew angle characteristics so as to produce from each station a plurality of laser scanning planes capable of reading bar code symbol orientated with bar code elements arranged in either a substantially vertical (i.e. picket-fence) configuration with respect to the horizontal scanning window of the system.

10. A bioptical holographic laser scanning system, wherein the plurality of pairs of quasi-orthogonal laser scanning planes are produced using S-polarized laser beams directed incident the holographic scanning disc.

11. A bioptical holographic laser scanning system, wherein four symmetrically placed visible laser diodes (VLDs) are used create the plurality of pairs of quasi-orthogonal laser scanning planes.

12. A bioptical holographic laser scanning system, wherein a single VLD is used to create the vertical window scan pattern, thereby minimizing crosstalk.

13. A bioptical holographic laser scanning system, wherein the size of the laser beam folding mirrors employed at each laser scanning station of the present invention are minimized.

14. A bioptical holographic laser scanning system, wherein blocking of light return paths by the laser beam folding mirrors has been eliminated.

15. A bioptical holographic laser scanning system, wherein mechanical interference between individual laser beam folding mirrors within the system has been eliminated.

16. A bioptical holographic laser scanning system, wherein the angles of incidence of the laser scanning beams at the horizontal scanning window have been optimized.

17. A bioptical holographic laser scanning system which generates a laser scanning pattern providing 360 degrees of scan coverage at a POS station, while the internal mirror-space volume of the scanning system has been minimized.

18. A bioptical holographic laser scanning system, wherein the "sweet spot" of the 360 laser scanning pattern is located at and above the center of the horizontal (i.e. bottom) scanning window, regardless of the item orientation or location of the bar code on the item.

19. A bioptical holographic laser scanning system, wherein the center of all groups of laser scanning planes generated by the system is directed toward the center of the horizontal scanning window, or to a line normal to the horizontal scanning window at the center thereof, thereby enhancing operator productivity by providing the feedback "beep" at substantially the same location above the horizontal scanning window for each and every item being scanned.

20. A bioptical holographic laser scanning system, wherein the size of the scan data collecting photodetector at each laser scanning station is minimized.

21. A bioptical holographic laser scanning system, wherein the location of the scan data collecting photodetector at each laser scanning station is determined using a novel spreadsheet-based design process that minimizes the vertical space required for placement of the parabolic light collection mirror beneath the scanning disc.

22. A bioptical holographic laser scanning system, wherein the size, shape and orientation of the scan data collecting photodetector at each laser scanning station is designed so that the lateral shift of the reflected beam image across the light sensitive surface of the photo detector, as a scanned item moves through the depth of field region of the scanning station, which results in a relatively uniform light level reaching the light sensitive surface of the photodetector.

23. A bioptical holographic laser scanning system, wherein shift of collected light across the data detector (as an item moves through the depth of field in the scanning region) minimizes variation in signal.

24. A bioptical holographic laser scanning system, comprising a holographic scanning disc with multiple facets which simultaneously focus multiple scanning beams to overlapping regions in the 3-D scanning volume at varying focal distances (preferably, less than 2 inches or less difference in focal distance).

25. A bioptical holographic laser scanning system, wherein use of a 12 facet disk design increases the signal level for a 6 inch disk, necessary for POS scanners, which must provide lower laser power levels at the scan windows.

26. A bioptical holographic laser scanning system, wherein use of an S-polarized beam at the disk maximizes signal and provide better resolution throughout the DOF region.

27. A bioptical holographic laser scanning system, comprising a holographic scanning disk with skew facets having symmetric Left and Right skew angle characteristics which cooperate with different laser scanning stations to produce substantially similar scan patterns.

28. A bioptical holographic laser scanning system, wherein splitting and tilting the vertical-window horizontal scan lines and the operator-side-station horizontal scan lines enhances scan coverage.

29. A bioptical holographic laser scanning system, wherein recessing selected portions of the scanner base plate allows reduction of the box height.

30. A bioptical holographic laser scanning system, wherein parabolic mirror with modified, non-sector-shaped, cross-section maximizes light collection efficiency.

31. A bioptical holographic laser scanning system, wherein use of optimum skew angle for each of the skew facets provides maximum scan coverage while minimizing the mirror-space volume.

32. A bioptical holographic laser scanning system, wherein selection of diffraction angles provides maximum scan coverage while still allowing complete blockage of the facet from undesired ambient light.

33. A bioptical holographic laser scanning system, wherein fixed beam blocker prohibits ambient light at the zero order beam angle to be directed to the data detector by the parabolic mirror.

34. A bioptical holographic laser scanning system, wherein undercut box design allows for a smaller scanner footprint in both the X-dimension and the Y-dimension.

35. A bioptical holographic laser scanning system, wherein turning the VLD off when the scan line is no longer in the window eliminates unwanted internal scattering of the laser light and extends the life of the laser.

36. A bioptical holographic laser scanning system capable of generating a complex of pairs of quasi-orthogonal laser scanning planes, each composed by a plurality of substantially-vertical laser scanning planes for reading bar code symbols having bar code elements (i.e. ladder-type bar code symbols) that are oriented substantially horizontal with respect to the bottom scanning window, and a plurality of substantially-horizontal laser scanning planes for reading bar code symbols having bar code elements (i.e. picket-fence type bar code symbols) that are oriented substantially vertical with respect to the bottom scanning window.

37. A bioptical holographic laser scanning system, wherein each scan data collecting photodetector is positioned behind a beam folding mirror having a small hole formed therethrough to allow the return light from a parabolic mirror beneath the scanning disc to reach the photodetector, thereby enabling optimum placement of the photodetector and nearly maximum use of the surface of the beam folding mirror for light collection while providing a light shield for the data detector.

38. A bioptical holographic laser scanning system, wherein the light collection efficiency of each scanning facet is optimized in order to compensate for variations in facet collection area during laser scanning operations.

39. A bioptical holographic laser scanning system, wherein a beam deflecting mirror is supported on the back side of each parabolic collection mirror, beneath a notch formed therein, to allow an incident laser beam, produced beyond the scanning disc, to be directed through the light collection mirror and onto the point of incidence of the scanning disc during scanning operation.

40. A bioptical holographic laser scanning system, wherein a single beam folding mirror is used as the last outgoing mirror to produce a plurality of different laser scanning planes that are projected out through the vertical scanning window, thereby allowing greater light collection for a given amount of space (or potentially less space).

41. A bioptical holographic laser scanning system, wherein a light pipe or other light guiding structure can be used to conduct collected light at a point of collection within the system, and guiding such light to a photodetector located at a convenient location within the system.

42. A bioptical holographic laser scanning system, wherein a light-collection cone can be used to reduce the size of the photodetector.

43. A bioptical holographic laser scanning system which produces a three-dimensional laser scanning volume that is substantially greater than the volume of the housing of the holographic laser scanner itself, and provides full omni-directional scanning within the laser scanning volume.

44. A bioptical holographic laser scanning system, in which the three-dimensional laser scanning volume has multiple focal planes and a highly confined geometry extending about a projection axis extending from the scanning windows of the holographic scanning system.

45. A bioptical holographic laser scanning system, in which laser light produced from a particular holographic optical element reflects off a bar code symbol, passes through the same holographic optical element, and is thereafter collimated for light intensity detection.

46. A bioptical holographic laser scanning system, in which a plurality of lasers simultaneously produce a plurality of laser beams which are focused and scanned through the scanning volume by a rotating disc that supports a plurality of holographic facets.

47. A bioptical holographic laser scanning system, in which the holographic optical elements on the rotating disc maximize the use of the disk space for light collection, while minimizing the laser beam velocity at the focal planes of each of the laser scan patterns, in order to minimize the electronic bandwidth required by the light detection and signal processing circuitry.

48. A compact bioptical holographic laser scanning system, in which substantially all of the available light collecting surface area on the scanning disc is utilized and the light collection efficiency of each holographic facet on the holographic scanning disc is substantially equal, thereby allowing the holographic laser scanner to use a holographic scanning disc having the smallest possible disc diameter.

49. A bioptical holographic laser scanning system, in which laser beam astigmatism caused by the inherent astigmatic difference in each visible laser diode is effectively eliminated prior to the passage of the laser beam through the holographic optical elements on the rotating scanning disc.

50. A bioptical holographic laser scanning system, in which the dispersion of the relatively broad spectral output of each visible laser diode by the holographic optical elements on the scanning disc is effectively automatically compensated for as the laser beam propagates from the visible laser diode, through an integrated optics assembly, and through the holographic optical elements on the rotating disc of the holographic laser scanner.

51. A bioptical holographic laser scanning system, in which a conventional visible laser diode is used to produce a laser scanning beam, and a simple and inexpensive arrangement is provided for eliminating or minimizing the effects of the dispersion caused by the holographic disc of the laser scanner.

52. A bioptical holographic laser scanning system, in which the inherent astigmatic difference in each visible laser diode is effectively eliminated prior to the laser beam passing through the holographic optical elements on the rotating disc.

53. A bioptical holographic laser scanning system, in which the laser beam produced from each laser diode is processed by a single, ultra-compact optics module in order to circularize the laser beam produced by the laser diode and eliminate the inherent astigmatic difference therein.

54. A bioptical holographic laser scanning system, in which an independent light collection/detection subsystem is provided for each laser diode employed within the holographic laser scanner.

55. A bioptical holographic laser scanning system, in which an independent signal processing channel is provided for each laser diode and light collection/detection subsystem in order to improve the signal processing speed of the system.

56. A bioptical holographic laser scanning system, in which a plurality of signal processors are used for simultaneously processing the scan data signals produced from each of the photodetectors within the holographic laser scanner.

57. A bioptical holographic laser scanning system, in which each facet on the holographic disc has an identification code which is encoded by the zero-th diffraction order of the outgoing laser beam and detected so as to determine which scanning planes are to be selectively filtered during the symbol decoding operations.

58. A bioptical holographic laser scanning system, in which the zero-th diffractive order of the laser beam which passes directly through the respective holographic optical elements on the rotating disc is used to produce a start/home pulse for use with stitching-type decoding processes carried out within the scanner.

59. A laser scanning system comprising:

a housing including first and second windows;

a plurality of holographic optical elements disposed within said housing; and

a plurality of laser scanning stations disposed within said housing, each comprising a light beam source and groups of light bending mirrors that are operably coupled to said plurality of holographic optical elements to generate multi-directional scanning beams passing through said first and second windows;

wherein said plurality of holographic optical elements comprise:

a first group G_1 of holographic optical elements each generating outgoing light beams offset in at least a left skew direction with respect to incident light beams, and

a second group G_2 of holographic optical elements each generating outgoing light beams offset in at least a right skew direction with respect to incident light beams.

60. The laser scanning system of claim 59, wherein each laser scanning station LS_i comprises:

a light beam source S_i producing light beams I_i,

wherein, when said light beams I_i are incident on said first group G_1 of holographic optical elements, outgoing light beams I_{i1} that are offset in at least said left skew direction with respect to the incident light beams I_i are directed to a first group M_{i1} of light bending mirrors, which direct said light beams I_{i1} through at least one of said first and second windows, wherein said first group M_{i1} of light bending mirrors directs reflected light beams I_{i1}' along an optical path to light collection optical elements for analysis by signal processing circuitry,

wherein, when said light beams I_i are incident on said second group G_2 of holographic optical elements, outgoing light beams I_{i2} that are offset in at least said right skew direction with respect to the incident light beams I_i are directed to a second group M_{i2} of light bending mirrors, which direct said light beams I_{i2} through at least one of said first and second windows, wherein said second group M_{i2} of light bending mirrors directs reflected light beams I_{i2}' along an optical path to light collection optical elements for analysis by signal processing circuitry.

61. The laser scanning system of claim 60,

wherein said plurality of holographic optical elements further comprise a third group G_3 of holographic optical elements each generating outgoing light beams offset in at least elevation with respect to incident light beams; and

wherein, when said light beams I_i produced by each laser scanning station LS_i are incident on said third group G_3 of holographic optical elements, outgoing light beams I_{i3} that are offset in at least elevation with respect to the incident light beams I_i are directed to a third group B_{i3} of light bending mirrors, which direct said light beams I_{i3} through at least one of said first and second windows, wherein said third group M_{i3} of light bending mirrors directs reflected light beams I_{i3}' along an optical path to light collection optical elements for analysis by signal processing circuitry.

62. The laser scanning system of claim 60,

wherein said plurality of holographic optical elements further comprise a third group G_3 of holographic optical elements each generating outgoing light beams offset in only elevation with respect to incident light beams; and

wherein, when said light beams I_i produced by each laser scanning station LS_i are incident on said third group G_3 of holographic optical elements, outgoing light beams I_{i3} that are offset in only elevation with respect to the incident light beams I_i are directed to a third group B_{i3} of light bending mirrors, which direct said light beams I_{i3} through at least one of said first and second windows, wherein said third group M_{i3} of light bending mirrors directs reflected light beams I_{i3}' along an optical path to light collection optical elements for analysis by signal processing circuitry.

63. The laser scanning system of claim 59, wherein said first window has a substantially horizontal orientation and said second window has a substantially vertical orientation.

64. The laser scanning system of claim 59, wherein light beams I_1 produced from light beam source S_1 of a first laser scanning station LS_1 are substantially orthogonal to light beams I_2 produced from light beam source S_2 of a second laser scanning station LS_2.

65. The laser scanning system of claim 59, wherein said plurality of laser scanning stations comprise four laser scanning stations, wherein light beams produced by two of the four laser scanning stations produce substantially orthogonal light beams with respect to light beams produced by the other two of the four laser scanning stations.

66. The laser scanning system of claim 59, wherein some of said light bending mirrors having a different number of vertices than other light bending mirrors.

67. The laser scanning system of claim 59, wherein geometry, placement and orientation of said light bending mirrors is optimized to satisfy physical constraints with respect to said housing.

68. The laser scanning system of claim 59, wherein said holographic optical elements are integrated into a rotatable unitary element.

69. The laser scanning system of claim 68, wherein said holographic optical elements are integrated in a rotating disc.

70. The laser scanning system of claim 59, further comprising light collection optical elements that include a parabolic mirror and a photodetector.

71. The laser scanning system of claim 59, further comprising light collection optical elements that include a separate parabolic mirror and photodetector for each laser scanning station.

72. The laser scanning system of claim 71, wherein said photodetector is substantially disposed above incidence of the light beams onto said holographic optical elements.

73. The laser scanning system of claim 59, wherein a first set of laser scanning stations are operably coupled to said plurality of holographic optical elements to generate multi-directional scanning beams passing through said first window, and a second set of laser scanning stations, distinct from said first set of laser scanning stations, are operably coupled to said plurality of holographic optical elements to generate multi-directional scanning beams passing through said second window.

74. The laser scanning system of claim 73, wherein said first window has a substantially horizontal orientation and said second window has a substantially vertical orientation, and wherein said second set of laser scanning stations comprise a single laser scanning station that is operably coupled with said plurality of holographic optical elements to generate said multi-directional scanning beams passing through said second window.

75. The laser scanning system of claim 59, wherein said first and second windows include spectral filtering subsystem that transmits a narrow band of spectral components including said multi-directional scanning beams.

76. The laser scanning system of claim 59, wherein said multi-directional scanning beams comprise pairs of quasi-orthogonal scanning beams.

77. The laser scanning system of claim 69, wherein axis of rotation of said rotating disk has a substantially vertical orientation, said first window has a substantially horizontal orientation, and said second window has a substantially vertical orientation.

78. The laser scanning system of claim 77, further comprising light collection optical elements that include a photodetector substantially disposed above incidence of light beams onto said holographic optical elements.

79. The laser scanning system of claim 77, further comprising light collection optical elements that include said holographic optical elements and a separate parabolic mirror and photodetector for each laser scanning station.

80. The laser scanning system of claim 59, wherein a given laser scanning station includes a light beam source comprising a visible laser diode, at least one collimating lens and a diffractive optical element producing S polarized light incident on said holographic optical elements.

81. The laser scanning system of claim 70, wherein said collimating lens and diffractive optical element substantially eliminate astigmatic characteristics of light produced by the visible laser diode.

82. The laser scanning system of claim 59, wherein said signal processing circuitry comprises multiple decoding channels.

83. The laser scanning system of claim 82, further comprising a mechanism for linking, in each decoding channel, a particular holographic optical element to a given scan data signal.

84. The laser scanning system of claim 83, further comprising a mechanism for analyzing scan data signal fragments over multiple decoding channels to identify bar code symbols therein.

85. A laser scanning system comprising:

a housing including a bottom window and a side window; and

a plurality of laser scanning stations, disposed within said housing, that cooperate with a plurality of holographic optical elements to produce quasi-orthogonal scanning planes projected within a 3-D scanning volume disposed above said bottom window and adjacent said side window.

86. The laser scanning system of claim 85, wherein each laser scanning station comprises a light beam source producing light beams and groups of light bending mirrors that cooperate with said plurality of holographic optical elements to produce pairs of quasi-orthogonal laser scanning planes projected within said 3-D scanning volume.

87. The laser scanning system of claim 85, said plurality of holographic optical elements comprise a plurality of multi-faceted volumetric holograms supported by a scanning disc.

88. The laser scanning system of claim 86, wherein some of said groups of light bending mirrors have high and low elevation angle characteristics.

89. The laser scanning system of claim 86, wherein some of said groups of light bending mirrors cooperate with holographic optical elements having left skew angle characteristics and other groups of light bending mirrors cooperate with holographic optical elements having right skew angle characteristics.

90. The laser scanning system of claim 85, wherein said bottom window has a substantially horizontal orientation and said side window has a substantially vertical orientation.

91. The laser scanning system of claim 85, wherein said plurality of laser scanning stations comprise four laser scanning stations.

92. The laser scanning system of claim 85, wherein each laser scanning station includes light collection optical elements comprising a parabolic mirror and a photodetector.

93. The laser scanning system of claim 92, wherein said photodetector is substantially disposed above incidence of light beams onto said plurality of holographic optical elements.

94. The laser scanning system of claim 85, wherein a first set of laser scanning stations produce laser scanning planes passing through said bottom window, and a second set of laser scanning stations, distinct from said first set of laser scanning stations, produce laser scanning planes passing through said side window.

95. The laser scanning system of claim 95, wherein said bottom window has a substantially horizontal orientation and said side window has a substantially vertical orientation, and wherein said second set of laser scanning stations comprise a single laser scanning station that produces laser scanning planes passing through said side window.

96. The laser scanning system of claim 85, wherein said bottom and side windows include a spectral filtering subsystem that transmits a narrow band of spectral components including said quasi-orthogonal scanning planes.

97. The laser scanning system of claim 86, wherein said light beam source for a given laser scanning station includes a visible laser diode, at least one collimating lens and a diffractive optical element producing S polarized light.

98. The laser scanning system of claim 97, wherein said collimating lens and diffractive optical element substantially eliminate astigmatic characteristics of light produced by the visible laser diode.

99. The laser scanning system of claim 85, further comprising light collection optical elements coupled to signal processing circuitry that has multiple decoding channels.

100. The laser scanning system of claim 99, further comprising a mechanism for linking, in each decoding channel, a particular optical path to a given scan data signal.

101. The laser scanning system of claim 100, further comprising a mechanism for analyzing scan data signal fragments over multiple decoding channels to identify bar code symbols therein.

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102. A laser scanning system comprising:

a housing having a first portion and a second portion, said first portion having a bottom window, and said second portion having a side window; and

a plurality of laser scanning stations, each comprising a light beam source and corresponding groups of light bending mirrors disposed within said housing, that cooperate with a plurality of light directing elements to produce laser scanning planes projected within a 3-D scanning volume disposed above said bottom window and adjacent said side window;

wherein a first set of laser scanning stations, disposed within said first portion of said housing, produce laser scanning planes passing through said bottom window;

wherein said first portion of said housing has a depth of less than 5 inches.

103. The laser scanning system of claim 102, wherein depth of said first portion is less than 3.5 inches.

104. The laser scanning system of claim 102, wherein a second set of laser scanning stations produce laser scanning planes passing through said side window.

105. The laser scanning system of claim 104, wherein said second portion houses groups of light bending mirrors for said second set of light scanning stations.

106. The laser scanning system of claim 102, wherein volume of said housing is less than 2000 cubic inches.

107. The laser scanning system of claim 102, wherein volume of said housing is less than 1650 cubic inches.

108. The laser scanning system of claim 102, wherein said 3-D scanning volume is greater than 400 cubic inches.

109. The laser scanning system of claim 102, wherein resolution of a bar code symbol that the laser scanning planes can resolve is on the order of 0.006 inches wide.

110. The laser scanning system of claim 102, wherein said laser scanning planes are quasi-orthogonal.

111. The laser scanning system of claim 102, wherein said plurality of light directing elements comprise a plurality of multi-faceted volume holographic elements.

112. The laser scanning system of claim 111, said plurality of multi-faceted volume holographic elements are supported by a scanning disc.

113. The laser scanning system of claim 102, wherein some groups of light bending mirrors cooperate with light directly elements that have high elevation angle characteristics, and other groups of light bending mirrors cooperate with light directly elements that having low elevation angle characteristics.

114. The laser scanning system of claim 102, wherein some groups of light bending mirrors cooperate with light directing elements that have left skew angle characteristics, and other groups of light bending mirrors cooperate with light directing elements that have right skew angle characteristics.

115. The laser scanning system of claim 102, wherein said bottom window has a substantially horizontal orientation and said side window has a substantially vertical orientation.

116. The laser scanning system of claim 102, wherein said plurality of laser scanning stations comprise four laser scanning stations.

117. The laser scanning system of claim 102, wherein some of said light bending mirrors having a different number of vertices than other light bending mirrors.

118. The laser scanning system of claim 102, wherein geometry, placement and orientation of said light bending mirrors are optimized to satisfy physical constraints with respect to said housing.

119. The laser scanning system of claim 102, wherein each laser scanning station includes light collection optical elements comprising a parabolic mirror and a photodetector.

120. The laser scanning system of claim 119, wherein said photodetector is substantially disposed above incidence of light beams onto said light directing elements.

121. The laser scanning system of claim 102, wherein said bottom window has a substantially horizontal orientation and said side window has a substantially vertical orientation, and wherein said second set of laser scanning stations comprise a single laser scanning station that produces laser scanning planes passing through said side window.

122. The laser scanning system of claim 102, wherein said bottom and side windows include a spectral filtering subsystem that transmits a narrow band of spectral components including said laser scanning planes.

123. The laser scanning system of claim 102, wherein said light beam source for a given laser scanning station includes a visible laser diode, at least one collimating lens and a diffractive optical element producing S polarized light.

124. The laser scanning system of claim 123, wherein said collimating lens and diffractive optical element substantially eliminate astigmatic characteristics of light produced by the visible laser diode.

125. The laser scanning system of claim 102, further comprising light collection optical elements coupled to signal processing circuitry that has multiple decoding channels.

126. The laser scanning system of claim 125, further comprising a mechanism for linking, in each decoding channel, a particular optical path to a given scan data signal.

127. The laser scanning system of claim 126, further comprising a mechanism for analyzing scan data signal fragments over multiple decoding channels to identify bar code symbols therein.

128. The laser scanning system of claim 102, wherein said first portion of the housing is disposed under a counter in a point of sale application.

129. The laser scanning system of claim 63, wherein a given laser scanning station produces scan lines that pass through said second window, said given laser scanning station comprising a collimating lens that cooperates with said plurality of holographic optical elements to increase focal distance of scan lines passing through said second window, thereby allowing said plurality of holographic optical elements to be used in producing scan lines that pass through both first and second windows.

130. The laser scanning system of claim 71, wherein said holographic optical elements are integrated in a rotating disc, and wherein said photodetector is mounted directly above the edge of the rotating disc.

131. The laser scanning system of claim 71, wherein said holographic optical elements are integrated in a rotating disc, and wherein said photodetector is mounted outside the outer periphery of the rotating disc.

132. The laser scanning system of claim 59, wherein at least one member of said first group G_1 of holographic optical elements have symmetrical left skew angle characteristics with respect to the right skew angle characteristics of at least one corresponding member of said second group G_2 of holographic optical elements.

133. The laser scanning system of claim 59, comprising multiple holographic optical elements which simultaneously focus multiple scanning beams to overlapping regions in a 3-D scanning volume at varying focal distances (preferably, less than 2 inches or less difference in focal distance), which minimizes the effects of paper noise.

134. The laser scanning system of claim 71, wherein said photodetector is disposed behind a given light bending mirror.

135. The laser scanning system of claim 134, wherein said given light bending mirror has a passageway that allows light collected by a corresponding parabolic mirror to reach said photodetector.

136. The laser scanning system of claim 59, wherein said light beam source for a given laser scanning station is deactivated (e.g., turned off) when the scan line produced therefrom is no longer passing through the first window or second window.

137. The laser scanning system of claim 59, wherein said holographic optical elements are integrated in a rotating disc, and wherein a light blocking element is disposed between said

rotating disc and said first window, said light blocking element blocking zero-order beams produced from the rotating disc from passing through the first window, and said light blocking element blocking ambient light passing through the first window from reaching light collecting optical elements.

138. The laser scanning system of claim 85, wherein a given laser scanning station produces scan lines that pass through said side window, said given laser scanning station comprising a collimating lens that cooperates with said plurality of holographic optical elements to increase focal distance of scan lines passing through said side window, thereby allowing said plurality of holographic optical elements to be used in producing scan lines that pass through both bottom and side windows.

139. The laser scanning system of claim 92, wherein said holographic optical elements are integrated in a scanning disc, and wherein said photodetector is mounted directly above the edge of the scanning disc.

140. The laser scanning system of claim 92, wherein said holographic optical elements are integrated in a scanning disc, and wherein said photodetector is mounted outside the outer periphery of the scanning disc.

141. The laser scanning system of claim 89, wherein at least one holographic optical element has a symmetrical left skew angle characteristic with respect to the right skew angle characteristic of at least one other holographic optical element.

142. The laser scanning system of claim 85, comprising multiple holographic optical elements which simultaneously focus multiple scanning beams to overlapping regions in a 3-D scanning volume at varying focal distances (preferably, less than 2 inches or less difference in focal distance), which minimizes the effects of paper noise.

143. The laser scanning system of claim 86, wherein each laser scanning station includes light collection optical elements comprising a parabolic mirror and a photodetector, wherein said photodetector is disposed behind a given light bending mirror.

144. The laser scanning system of claim 143, wherein said given light bending mirror has a passageway that allows light collected by a corresponding parabolic mirror to reach said photodetector.

145. The laser scanning system of claim 86, wherein said light beam source for a given laser scanning station is deactivated (e.g., turned off) when the scan line produced therefrom is no longer passing through the bottom window or side window.

146. The laser scanning system of claim 85, wherein said holographic optical elements are integrated in a rotating disc, and wherein a light blocking element is disposed between said rotating disc and said bottom window, said light blocking element blocking zero-order beams produced from the rotating disc from passing through the bottom window, and said light blocking element blocking ambient light passing through the bottom window from reaching light collecting optical elements.

147. The laser scanning system of claim 111, wherein a given laser scanning station produces scan lines that pass through said side window, said given laser scanning station comprising a collimating lens that cooperates with said plurality of multi-faceted volume holographic elements to increase focal distance of scan lines passing through said side window, thereby allowing said plurality of multi-faceted volume holographic elements to be used in producing scan lines that pass through both bottom and side windows.

148. The laser scanning system of claim 119, wherein said multi-faceted volume holographic elements are integrated in a scanning disc, and wherein said photodetector is mounted directly above the edge of the scanning disc.

149. The laser scanning system of claim 119, wherein said multi-faceted volume holographic elements are integrated in a scanning disc, and wherein said photodetector is mounted outside the outer periphery of the scanning disc.

150. The laser scanning system of claim 114, wherein at least one light directing element has a symmetrical left skew angle characteristic with respect to the right skew angle characteristic of at least one other light directing element.

151. The laser scanning system of claim 102, comprising multiple light directing elements which simultaneously focus multiple scanning beams to overlapping regions in a 3-D scanning volume at varying focal distances (preferably, less than 2 inches or less difference in focal distance), which minimizes the effects of paper noise.

152. The laser scanning system of claim 119, wherein said photodetector is disposed behind a given light bending mirror.

153. The laser scanning system of claim 152, wherein said given light bending mirror has a passageway that allows light collected by a corresponding parabolic mirror to reach said photodetector.

154. The laser scanning system of claim 102, wherein a light beam source for a given laser scanning station is deactivated (e.g., turned off) when the scan line produced therefrom is no longer passing through the bottom window or side window.

155. The laser scanning system of claim 111, wherein said multi-faceted volume holographic elements are integrated in a scanning disc, and wherein a light blocking element is disposed between said scanning disc and said bottom window, said light blocking element blocking zero-order beams produced from the scanning disc from passing through the bottom window, and said light blocking element blocking ambient light passing through the bottom window from reaching light collecting optical elements.